

NATIONAL INSTITUTES OF HEALTH

NATIONAL LIBRARY OF MEDICINE

Division of Specialized Information Services

Annual Report
Fiscal Year 1999

Programs and Services

U.S. Department of Health and Human Services
Public Health Service
Bethesda, Maryland

SPECIALIZED INFORMATION SERVICES

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The Toxicology and Environmental Health Information Program (TEHIP), originally known as the Toxicology Information Program, was established more than 30 years ago within the National Library of Medicine in the Division of Specialized Information Services (SIS). Over the years TEHIP has evolved to provide for the increasing need for toxicological and environmental health information, taking advantage of new computer and communication technologies. Such mechanisms have enabled us to provide more rapid access to a wider audience. Our development of novel search capabilities means that users need not have extensive search knowledge and thus allows data to be relayed to them more efficiently. Finally, we have moved beyond the bounds of the physical National Library of Medicine, exploring ways to point and link users to relevant sources of toxicological and environmental health information wherever these sources may reside. This is being accomplished primarily through the TEHIP and AIDS Web sites developed and maintained by SIS. Continuous refinements and additions are made to allow easy access to a range of information collected by this Division. Significantly, our usage increased over the past year as we made access to all toxicology data free over the Internet. All access to NLM's AIDS/HIV information resources has been free for several years.

In FY 1999 SIS reexamined the scope and coverage of current programs, proposed new opportunities to enhance SIS information services, and investigated emerging areas, including the application of new multimedia technology in the delivery of information services. This examination has been guided by an Institute of Medicine (IOM) evaluation of the TEHIP Program in a report, *Toxicology and Environmental Health Information Resources: the Role of the National Library of Medicine*, released in the spring of 1997. Another IOM committee was convened in FY 1998 to prepare a follow-on report, which has also been instrumental in our planning process. The report of this committee was published in 1999 as *Internet Access to the NLM's Toxicology and Environmental Health Databases*.

Resource Building

The wide range of resources related to toxicology and environmental health information and AIDS/HIV information include many databases that are created or acquired as well as other services and projects.

The **Hazardous Substances Data Bank (HSDB)** continues to be a highly used resource, averaging over 6,000 searches each month. Increased emphasis was placed on providing more data on human toxicology and clinical medicine within HSDB, in keeping with earlier recommendations of the Board of Regents' Subcommittee on TEHIP. Changes to the composition of the Scientific Review Panel were made to accommodate the shift in content emphasis. Newer sources of relevant data are being examined for incorporation into new and existing data fields within the current 4,545 HSDB records. Because of increased staff efforts, more records are being processed through special enhancements, including source updates from various peer-reviewed files. These enhancements are being made possible by a customized Windows-based PC workstation with enhanced file-building features.

CHEMID (**Chemical Identification File**) is an NLM online chemical dictionary that contains over 344,000 records, primarily describing chemicals of biomedical and regulatory importance. It also contains an important set of regulatory data, collectively known as SUPERLIST. Over 13,000 records are augmented with the name and an indication of source for chemicals mentioned in one or more of 31 lists,

e.g., the Department of Transportation Hazardous Materials List, and the Priority List of the Agency for Toxic Substances and Disease Registry (ATSDR). These data allow users to determine if a chemical is mentioned on a given list and under what name, as well as to search for chemical classes on these lists. During FY 1999, an extensive quality control effort was made on data in this file and new nomenclature data was added to enrich the file content.

TOXLINE (Toxicology Information Online) is an NLM online bibliographic retrieval service produced by merging “toxicology” subsets from some 18 secondary sources. TOXLINE and its backfile, TOXLINE65, contain data from sources that do not require royalty charges based on usage. At the end of FY 1999 TOXLINE and its backfile contained over two and one half million citations. Explorations of new ways to build TOXLINE are in process as NLM continues its move to distributed systems.

DIRLINE (Directory of Information Resources Online) is NLM’s online directory of resources including organizations, databases, bulletin boards, as well as projects and programs with special biomedical subject focus. These resources provide information to users, which may not be available from one of the other NLM bibliographic or factual databases. DIRLINE continues to receive a high level of use through a new interface, which became public in October 1999. This new interface supports direct links to the web sites of the organizations listed in the database, as well as direct e-mail connections. Providing direct links for users facilitates ease of access for consumers as well as for health professionals. The quality of the database continues to improve as duplicates are eliminated through changes in policy and streamlining of maintenance. Health Hotlines, the popular publication of health-related toll-free telephone numbers, has a new web version that also indicates the availability of Spanish-speaking customer service representatives and Spanish language publications from the resources listed.

The **Toxic Chemical Release Inventory** (TRI) series of files now includes three online files, TRI95 through TRI97. These files remain an important resource for environmental release data and continue to attract new users. Mandated by the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986), these EPA-sponsored databases contain data on environmental release data to air, water, and soil for over 600 EPA-specified chemicals.

The **Chemical Carcinogenesis Research Information System** (CCRIS) continues to be built, maintained, and made publicly accessible by NLM. This data bank is supported by the National Cancer Institute (NCI) and has grown to over 8,000 records. The chemical-specific data covers the areas of carcinogenesis, mutagenesis, tumor promotion and tumor inhibition.

The **Integrated Risk Information System** (IRIS), EPA’s official health risk assessment file, continues to experience high usage and be very popular with the user community. EPA has had a version of IRIS on the agency’s Web page since 1996, and as we move to Web access we will consider how best to integrate our Web service with what EPA provides. IRIS now contains 535 chemicals.

The **GENE-TOX** file continues to be built and updated directly on TOXNET by EPA scientific staff. This file contains peer-reviewed genetic toxicology (mutagenicity) studies for about 3,200 chemicals. GENE-TOX receives a high level of interest among users in other countries.

The **Registry of Toxic Effects of Chemical Substances** (RTECS) is a data bank based upon a National Institute of Occupational Safety and Health (NIOSH) file by the same name which NLM has restructured and made available for online searching. With our move to free Internet access to all databases, NIOSH requested that we no longer include RTECS on our system.

The **Developmental and Reproductive Toxicology** (DART) database now contains over 43,000 citations from literature published since 1989 on agents that may cause birth defects. DART is a continuation of the Environmental Teratology Information Center backfile (ETICBACK) database, which contains almost 50,000 citations to literature published from 1950-1989. DART is funded by NLM, the Environmental Protection Agency, the National Institute of Environmental Health Sciences and the FDA's National Center for Toxicological Research and is managed by NLM.

The **Environmental Mutagen Information Center** (EMIC) database contains over 23,000 citations to literature on agents that have been tested for genotoxic activity. A backfile for EMIC (EMICBACK) contains over 75,000 citations to the literature published from 1950 to 1991. EMIC is funded by the Environmental Protection Agency and the National Institute of Environmental Health Sciences and managed by NLM.

Resource Access

The SIS Web server provides a central point of access for the varied programs, activities, and services of the Division. Through this server (<http://sis.nlm.nih.gov>) users can access interactive retrieval services in toxicology and environmental health or AIDS/HIV information, find program descriptions and documentation, or be connected to outside related resources. During FY 1999, a redesigned SIS web site was made available to the public. The SIS web site now incorporates information about SIS in general, as well as toxicology and environmental health (<http://sis.nlm.nih.gov/tehip.htm>) and AIDS information (<http://sis.nlm.nih.gov/hiv.htm>). Both the toxicology and environmental health and AIDS web pages provide links to NLM outreach activities in these subjects, access to NLM databases, links to selected web sites in these subjects, as well as tutorials, fact sheets, and other publications produced by SIS. Over 7,000 users visit the SIS web site weekly and view approximately 40,000 pages.

Toxicology Data Network (TOXNET)

The **Toxicology Data Network** (TOXNET), NLM's computer system providing access to the majority of its toxicology files, has moved from a networked microprocessor environment to a UNIX-based platform (Solaris Version 2.6) on a SUN Enterprise 3000 computer. Concurrent with this transition to improved hardware and software was the announcement that TOXNET access would be free via an easy-to-use Web interface. In FY 1999, SIS debuted a new search interface to access all of the SIS toxicology and environmental health databases. This new search interface (<http://toxnet.nlm.nih.gov>) allows users to easily search HSDB, TOXLINE, CCRIS, Gene-Tox, DART, EMIC, IRIS, and TRI. Based on recommendations from the Institute of Medicine, users are presented with a basic search screen with just a single input box for searching. Most relevant records are displayed first and all search terms are highlighted. The search system also assists users in searching for drugs or chemicals by automatically adding synonyms and CAS Registry Numbers. This feature enhances retrieval across databases, as well as simplifying search strategies for users. Users also have several options to sort records and to print and download all retrieved information. Custom search screens for more sophisticated users are under development.

Internet Grateful Med (IGM)

Near the end of FY 1998 access to TOXLINE and ChemID was added to IGM, where access to DIRLINE, the AIDS/HIV databases, MEDLINE, and many other NLM databases was already being provided. This route of access (<http://igm.nlm.nih.gov>) is free to all users.

Chemical Structure Server

The chemical structure server has evolved from a mechanism to provide structure searching for chemicals covered by SIS databases to a system for integrating chemical dictionary record building and structure searching. This system uses special molecular searching programs and includes a prototype database for construction of ChemID records. The chemical structure server was upgraded in 1999 to support ChemID*plus*, a new version of ChemID. It is available at <http://chem.sis.nlm.nih.gov/chemidplus/>. This new resource has all the nomenclature available in ChemID, plus over 57,000 chemical structures. Users may search by name or other identifier, as well as by chemical structure, substructure, or similar structure. There are hyperlinked Locators in ChemID*plus* that automatically search other Web resources such as MEDLINE, HSDB, and TOXLINE and SUPERLIST resources for a given chemical. In 1999, making the file public, the beginning of a new online maintenance system was added to the system.

AIDS Information Services

NLM has continued to refine its HIV/AIDS information services and make them more available to a wider audience. SIS staff led the development of the HIV/AIDS topic page on MEDLINE*plus*, identifying and organizing resources of specific interest to consumers. This page is a valuable addition to the redesigned NLM AIDS home page (<http://sis.nlm.nih.gov/hiv.htm>), which contains information about NLM's programs, access to the HIV/AIDS-related databases, and links to selected HIV/AIDS resources of a more technical nature.

NLM has continued its successful AIDS Community Outreach Program with 13 awards in FY 1999, bringing the total number of awards made under this program to 108. This year, for the first time, an award was made to another Federal agency, the AIDS Information Center, U.S. Department of Veterans Affairs, to place kiosks in the waiting rooms of infectious disease clinics. NLM-funded projects have ranged from the simple purchase of hardware and services to support a widely acclaimed web site (AEGIS), to the development of low literacy treatment fact sheets in English and Spanish, to supporting public libraries to establish AIDS resource centers within their institutions.

At the request of our partner PHS agencies, NLM assumed responsibility for project management of the AIDS Clinical Trials Information Service (ACTIS) and the HIV/AIDS Treatment Information Service (ATIS). NLM has been a partner in these projects since their inception, but now has increased responsibility. The ACTIS databases, AIDSTRIALS and AIDSDRUGS, are available through Internet Grateful Med, as well as on the Web.

NLM has provided training in the use of HIV/AIDS resources to a number of different audiences. As part of the collaborative Partners in Information Access for Public Health Professionals, SIS staff led the effort to conduct training via a two-hour satellite broadcast on February 11, 1999. This training, targeting those who work in local and state department of public health, included training in selecting high-quality, accurate resources, as well as a discussion of the most valuable of those resources. NLM has entered into a relationship with the National AIDS Minority Information and Education Program (NAMIE) to provide training at regional and other meetings. In addition, NLM continues to provide training at a variety of Historically Black Colleges and Universities (HBCUs) to faculty, staff, and members of the local community.

Outreach / User Support

SIS continues its support of the Toxicology Information Outreach Project. The objective of this initiative is to strengthen the capacity of HBCUs to train medical and other health professionals in the use of NLM's toxicological, environmental, occupational health and hazardous wastes information resources. In addition to providing workstations, training and free online access to HBCUs participating in the training development project, NLM has collaborated with the Agency for Toxic Substances and Disease Registry (ATSDR) to train representatives from additional schools in the use of NLM's valuable online resources. One of the training classes, hosted by Texas Southern University, included HBCUs and community-based organizations from the Lower Mississippi Delta. This class was jointly sponsored by ATSDR, NLM, and the Environmental Justice Office of the Environmental Protection Agency in support of the Mississippi Delta Project. Other classes with specific user group focus have been conducted in addition to our usual NLM-based training.

User Support Computer-Based Activities

In FY 1999, SIS developed TOXICOLOGY TUTOR III, third in a series of introductory level computer-based toxicology courses. It takes advantage of Windows' graphical user interface incorporating color graphics, photography, animation, and audio. The TOXICOLOGY TUTOR series is designed for the Internet, and is available on the SIS Web server. Additionally, SIS has developed computer-based demos for the Internet illustrating the TEHIP databases, ChemID, TOXLINE, RTECS, HSDB, CCRIS, IRIS, TRI, TRIFACTS, GENETOX, EMIC, and DART. This and several other overviews are available on the SIS website.

Alternatives to Animal Testing

SIS continued to compile and publish references from the MEDLARS files that were identified as relevant to methods or procedures, which could be used to reduce, refine, or replace animals in biomedical research and toxicological testing. Requests for these quarterly bibliographies have increased, as has the number of articles deemed relevant to the field. Bibliographies issued during the past four years are available on the Internet through the SIS Web server, and the primary distribution mechanism for this project is now the Internet.

Other Specialized Services

In addition to toxicologic data files, SIS is evaluating other areas for creating specialized factual and bibliographic databases. Resource allocations are being made to determine the feasibility of initiating more clinical medicine information products for public, health professional, and scientific audiences. One area that SIS is beginning to focus attention on is drug information. SIS is taking steps to begin a critical review of its role in organizing and disseminating drug information in various formats. Recognizing that drug literature is increasing exponentially, that the Food and Drug Administration is approving new drugs at a much greater rate with requirements for post approval research, and approximately 2,400 sole source drugs may still have research ongoing, the need for cataloging, disseminating information and identifying access points to relevant data sources has become especially important. Consumers are receiving drug information directly from pharmaceutical firms and numerous other sources, and one role that SIS is exploring is assessing the integrity and validity of such information. SIS is also proposing new initiatives that are timely and responsive to user needs, and will schedule focus groups to review such proposals to ensure that resources are utilized appropriately.